

CLOSE-UP EQUIPMENT

Close-up equipment is available for all Hasselblad cameras except the SWC/M. The accessories range from simple Proxar close-up lenses to bellows and microscope attachments.

As mentioned earlier, the 135mm and 120mm S-Planar lenses are designed for best image quality when used for close-up shooting. Other lenses can also be used with extension accessories and close-up lenses. You cannot reverse a C or F lens.

For simplified metering calculations during close-up shooting, use a metering prism finder. As long as the light level at the film plane is within the sensitivity range of the meter, it automatically compensates for light loss due to extension.

Hasselblad recommends various combinations of lenses and close-up accessories for different ranges of image magnifications. This information is summarized in this section. A description of the equipment follows. For additional information and formulas for close-up shooting, see Chapter 2.

PROXAR CLOSE-UP LENSES

Three close-up lenses, called *Proxar*, are available. They are made with a Series 50 mount only. Even though the S-Planar lenses also accept Series-50 accessories, they do not give best image quality with Proxar lenses.

Focal lengths of the close-up lenses are 0.5, 1.0, and 2.0m, giving them diopter ratings of +2, +1, and +0.5 respectively. Charts of this section show magnification ranges with Series-50 C and F lenses.

APPROXIMATE FOCUS TRAVEL OF SOME HASSELBLAD LENSES

Lens	Focus Travel
80mm Planar C	9mm
80mm Planar F	16mm
100mm Planar C	15mm
110mm Planar F	21mm
120mm S-Planar C	23mm
150mm Sonnar C or F	21mm
250mm Sonnar C	32mm

HOW TO USE CLOSE-UP CHARTS

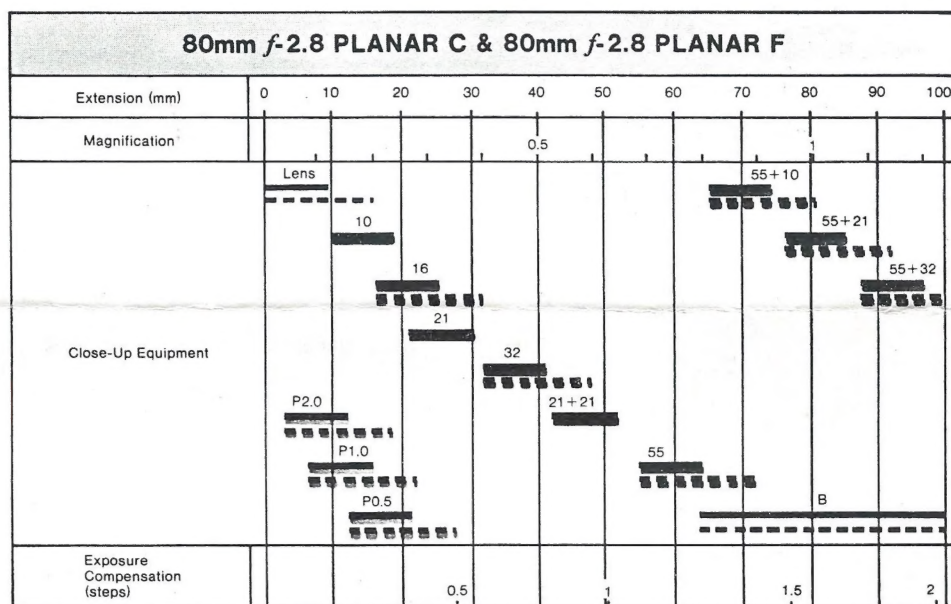
The charts on pages 159 to 162 summarize Hasselblad recommendations for close-up shooting. The heading of each illustration indicates which lens you use. Based on the desired image magnification, you can derive necessary total lens extension, the recommended close-up accessory, and exposure compensation in steps.

Bold black lines represent C lenses; dashed lines represent F lenses. The left side of the line represents the extension of the lens focused at infinity. The length of the line is the focus travel of the lens. The colored lines shown below are the code to the close-up accessory shown in the illustration.

Example: You want to use the 80mm *f*-2.8 C lens for an image magnification of 0.5. Find 0.5 on the Magnification Scale and follow the vertical line up to the Extension Scale. It indicates that 40mm of total extension is necessary. Follow the vertical line down to the solid black and green lines. They show that the 32mm extension tube with 8mm of lens focus travel gives 40mm extension and a magnification of 0.5. Follow the vertical line down to the Exposure Compensation Scale to find an exposure increase of about 1.0.

When using a Proxar (P) close-up lens, do not use the Exposure Compensation Scale.

C Lens ——— Proxar Close-Up Lens ——— Bellows Extension ———
F Lens - - - - - Extension Tube ———



AUTOMATIC EXTENSION TUBES

These tubes have a cocking shaft that retains automatic features of the lens. Before attaching tubes, cock them as you would a lens. Mount the cocked tube as you would a cocked lens onto a cocked camera. After mounting the tube, or tubes, attach the cocked lens.

The camera, tubes, and lens must be cocked before disassembly. Take the assembly apart by starting with the lens and work toward the camera. This prevents the cocking shaft from turning during disassembly, which could possibly jam the lens and tube together.

Five extension tubes with 10, 16, 21, 32 and 55mm lengths are avail-



Shown are the 16mm extension tube (top) and the 32mm extension tube (bottom). Notice that they have cocking shafts and mounting flanges like those of F and C lenses.

81 1.5 4

**PUPILARY MAGNIFICATION
OF SOME
HASSELBLAD LENSES**

	Lens	P
C Lenses	38mm f4.5 Biogon	1.06
	40mm f4 Distagon	2.25
	50mm f4 Distagon	1.80
	60mm f3.5 Distagon	1.57
	80mm f2.8 Planar	1.20
	100mm f3.5 Planar	1.16
	105mm f4.3 UV-Sonnar	0.86
	120mm f5.6 S-Planar	1.06
	135mm f5.6 S-Planar	1.18
	150mm f4 Sonnar	0.75
	250mm f5.6 Sonnar	0.57
	250mm f5.6 Sonnar Superachromat	0.52
F Lenses	50mm f2.8 Distagon	1.76
	80mm f2.8 Planar	1.20
	110mm fPlanar	1.09
	150mm f2.8 Sonnar	0.73

able. The 16mm and 32mm tubes are designed for use with F lenses, although they also work with C lenses.

Do not try to mount the 10mm or 21mm tubes between the 2000FC and the lens. The camera's shutter-speed ring gets in the way. You can, however, use the tubes in combination with any of the other three tubes mounted to the 2000FC. You cannot mount the 10mm and 16mm tubes to the rear of the 135mm S-Planar lens. Use them connected to a longer tube mounted to the lens.

EXTENSION BELLOWS

For adjustable extension from 2.5 to 8 inches (63.5 to 202mm), use an extension bellows. Two are available. The latest has a cocking shaft that preserves automatic features of the lens. The other bellows is an older, non-automatic model. In this discussion, I'll call these the *auto* and *non-auto bellows*.

Attaching the Bellows—Before attaching the auto bellows to the camera, cock the camera and the bellows. The rear standard of the auto bellows has a slotted cocking shaft like Hasselblad lenses.

First mount the bellows onto the camera as you would a lens. Then mount a cocked camera on the front standard of the cocked auto bellows. Do this as you would mount a lens on the camera. *Do not* mount lens first and camera second. When taking the assembly apart, take the lens off first and the camera off second.

100mm <i>f</i> 3.5 PLANAR C													
Extension (mm)	0	10	20	30	40	50	60	70	80	90	100		
Magnification						0.5							
Close-Up Equipment	Lens							55+10					
		10							55+21				
			16							55+32			
				21									
					32								
						32+10							
		P2.0											
			P1.0										
				P0.5									
							55						
								B					
Exposure Compensation (steps)			0.5			1				1.5			

110mm f-2 PLANAR F												
Extension (mm)	0	10	20	30	40	50	60	70	80	90	100	
Magnification						0.5						
Close-Up Equipment	Lens											
Exposure Compensation (steps)			0.5			1			1.5			

Cock the camera before mounting the non-auto bellows onto it. The bellows' rear standard cannot be cocked. Mount it like a lens. The front standard of the non-auto bellows does have a cocking shaft. It is connected to a cable-release socket on the front standard's mounting ring. Align the head of the cocking shaft with the red dots by turning the cocking knob of the front standard clockwise until it stops. Then you can mount a cocked lens onto the front standard.

Adjusting the Auto Bellows—Adjusting this double-rail bellows is quick and simple. The large knurled knob under the front standard adjusts bellows extension. The rear standard is fixed. A cm scale on the top rail

reads extension from 6.5cm to 20.2cm in 0.5cm increments. Read bellows extension where the white index of the front standard crosses the scale. Use this value in extension formulas from Chapter 2 or with the tables of this section. In either case, use the lens with its focusing scale set to infinity for simplest operation.

Another scale on the bellows indicates the exposure compensation factor necessary when you use the 135mm S-Planar lens. Because this lens does not have a helicoid focusing screw, bellows extension is directly related to magnification and the exposure compensation factor.

When the bellows is fully compressed, the lens acts like any 135mm